

# ReNeuron

#### Corporate Presentation January 2017

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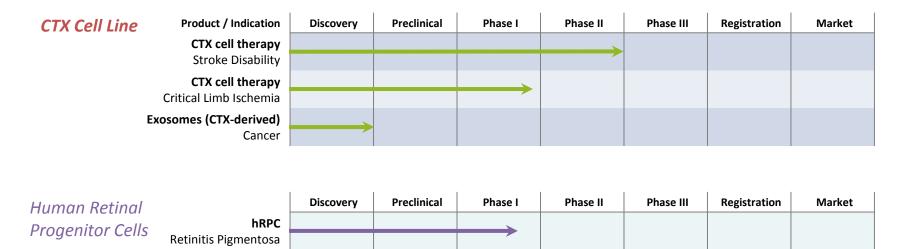
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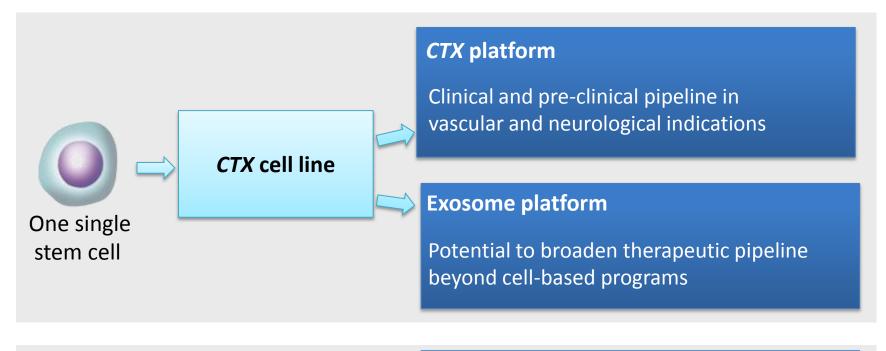
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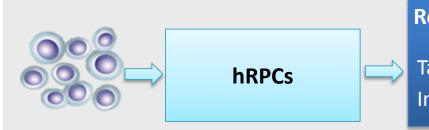
### **Company overview**

- Global leader in cell-based therapeutics
- Differentiated **allogeneic** (off-the-shelf) stem cell therapies
- At forefront of emerging **exosome-based nanomedicine**
- Unique pipeline based on 2 unique platforms:



# **Unique platform technologies**





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#### **Retinal platform**

Targeting retinal degenerative diseases In-licensed technology (Harvard, Boston)

# Well backed and well funded

• Backed by major generalist and specialist life science institutional investors:

Woodford Investment Management	35.5%
Wales Life Science Fund	9.5%
Invesco	9.3%
Aviva	5.7%

- \$74m cash on balance sheet (as at 30 September 2016):
  - Cash runway into late 2018
  - Funds therapeutic programs into mid or late-stage clinical development



# **Senior Management and Board of Directors**

#### **Senior Management**

0	Dlav Hellebø	Chief Executive Officer (Schering-Plough, Novartis, UCB, Clavis)	
Ν	/lichael Hunt ACA	Chief Financial Officer (Biocompatibles, Bunzl)	
D	Dr. John Sinden	Chief Scientific Officer and co-Founder	
D	Dr. Randolph Corteling	Head of Research	
S	haron Grimster	VP Development and General Manager, Wales (F-Star, Antisoma, Celltech)	
D	Dr. Julian Howell	Chief Medical Officer (Shield, ProStrakan, Roche, Pharmion)	
S	haun Stapleton	Head of Regulatory Affairs (Ely Lilly, Boehringer Ingelheim, Ipsen, RRG)	
Non-executive Board			
Jo	ohn Berriman	Chairman (Autolus, Algeta, Heptares, Abingworth)	
S	imon Cartmell OBE	(ApaTech, Celltech, Glaxo)	
D	Dr. Tim Corn	(Jazz Pharma, EUSA Pharma, Circassia, Glaxo)	
Р	Prof Sir Chris Evans OBE	(Arthurian, Excalibur)	
D	Dr. Paul Harper	(Physiomics, Sareum, CAT, Glaxo)	
D	Dr Michael Owen	Chair – ReNeuron Scientific Advisory Board (Zealand Pharma, Avacta, Kymab, GSK, ICRF)	



# **CTX** cell product





# **CTX** cell product

- *CTX,* a GMP validated, cryopreserved human neural stem cell product
  - 6 month shelf life
  - Allows product to be readily shipped and stored at the hospital
  - Closer to a conventional off-the-shelf pharmaceutical/biologic drug



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# **CTX for Stroke disability: unmet medical need**



- Stroke is the single largest cause of adult disability
- Annual health/social costs: >\$70 billion in the US
- No pharmaceutical treatment options available beyond 4 hours

Target is to improve motor recovery in disabled stroke survivors



# **CTX for Stroke disability: Phase I data published\***

- Phase I dose escalation safety study published with 24 months follow up
  - 11 disabled, stable stroke patients
  - Single, straightforward neurosurgical procedure
  - 6 months to 5 years post stroke
- No cell-related or immunological adverse events
- Encouraging results across multiple efficacy measures against stable baseline disability

Articles

#### THE LANCET

Human neural stem cells in patients with chronic ischaemic stroke (PISCES): a phase 1, first-in-man study



Dheenij Kalledka, John Sinden, Kenneth Poliock, Caroline Hoig, John McLean, Wilma Smith, Alex McConnachie, Celestine Sontosh, Philip M Bath, Lawrence Dunn, Kelzh W Muir

#### Summary

Background CTX0E03 is an immortalised human neural stem-cell line from which a drug product (CTX-DP) was developed for allogeneic therapy. Doso-dependent improvement in sensorimotor function in rats implanted with CTX-DP 4 weeks after middle cerebral artery occlusion stroke prompted investigation of the safety and tolerability of this treatment in stroke patients.

Published Dullaw August 3, 2016 http://dx.doi.org/10.1016/ 50140-6736(16)30513-X





\*Kalladka et al. The Lancet, 3 August 2016. http://dx.doi.org/10.1016/S0140-6736(16)30513-X

# CTX for Stroke disability – Phase II Study Design

Aim of the PISCES II Study:

- To demonstrate effect of CTX cells on improving outcome of patients during rehabilitation phase following an ischaemic stroke
- To provide further safety data in a larger group of patients

Inclusion Criteria

- Male and female patients; aged 40-89; 2-12 months after a stroke
- Very limited upper limb function (ARAT of 0,1)

**Study Procedures** 

- CTX 20 million cells injected into brain (putamen) on affected side
- Follow up for 12 months



# **Summary of Stroke Assessment Measures**

Name	Purpose of the Test	Elements	Clinically Meaningful Change
mRS (Modified Rankin Scale)	Global rating scale of functional independence	0-5 categories of mild to severe disability Low Number = Better	Scores 0-2 considered good outcome or Improvement of 1 category
B-I (Barthel Index)	Measure of independence and mobility in Activities of Daily Living	10 items of ADL 0-100 points; higher score indicates more independence High Number = Better	9 or more points increase
ARAT (Action Research Arm Test) ("Total ARAT")	Upper limb function test	19 tests of Grasp, Grip, Pinch and Gross Movement , 0-57 points High Number = Better	6 or more points increase
F-M (Fugl-Meyer)	Performance based assessment of sensorimotor function following stroke	0-226 points total 0-100 motor points High Number = Better	10 or more points in motor subscale



# **PISCES II Baseline demographics**

- 21 patients treated
- Male: 52%
- White: 95%
- Median Age: 62 yrs (41-79)
- Site of Ischaemic Infarct
  - Cortex: 53%
  - Subcortex: 14%
  - Cortex and Subcortex: 33%
- Median time from stroke to treatment: 7 months (2-13)
- 8 UK sites treated at least 1 patient
- Duration of Follow Up so far
  - 3 months 21 patients
  - 6 months 10 patients
  - 12 months 3 patients



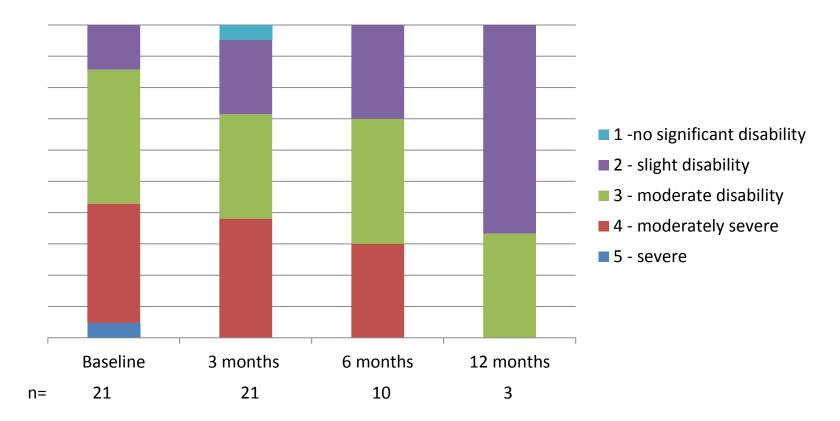
# PISCES II Efficacy – Modified Rankin Scale (mRS)

- Modified Rankin Scale
  - collected by Rankin Focused Assessment method
- 7 subjects have clinically significant mRS improvement
  - 6 by 1 category
  - 1 by 2 categories

Starting mRS	Last Measured mRS	Improvement first measured - months
5	3	1
4	3	1
3	2	1
3	2	1
3	2	3
2	1	3
3	2	6



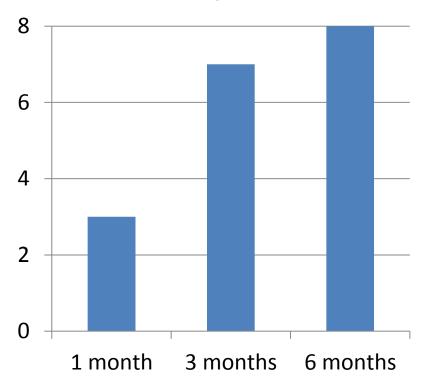
### **PISCES II Efficacy – shift in mRS scores**





# **PISCES II Efficacy – Barthel Index**

- Barthel Index
- 8 responders (8/21)
  - >9 point change from baseline (clinically significant)
  - 6/21 patients had BI <u>>90 at</u> baseline (therefore unable to reach 'responder' status)
  - 8/15 responders in evaluable subjects

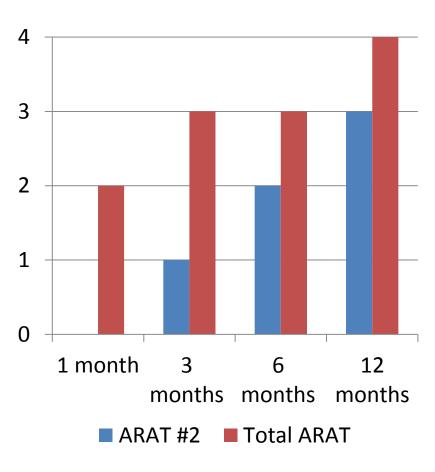


**B-I Responder** 



# **PISCES II Efficacy - ARAT**

- ARAT Test #2
  - 3 responders, with 2 or more point improvement (clinically significant)
  - Responding at 3, 6 and 12 months
  - No relapse back to lower score
- Total ARAT
  - 4 responders, with 6 or more point improvement (clinically significant)
  - Responding at 1, 1, 3 and 12 months





# **PISCES II Efficacy – Fugl-Meyer**

- Fugl-Meyer
  - Data available on 8 subjects as this assessment was introduced mid-way through study
- 3 F-M responders (total motor score)
  - All at 3 months
  - Separate patients to the ARAT responders



# **PISCES II – Conclusions**

- Rate of patient improvement in patients with established disability due to stroke has greatly exceeded what we expected
  - 15 of 21 patients responded to one or more of the four efficacy measures
  - Response rate on mRS was unexpected and is promising for future clinical development
- CTX intracerebral injection was well tolerated
  - Adverse Events were attributed to surgical procedure or stroke complications
  - 1 death due to sepsis, 7 months after CTX treatment. Assessed as not attributable to treatment.



# **Phase III Study**

- Based on the PISCES II results we are planning a Phase III study
  - Aim to show an improvement in patients with established stroke related disability
- Randomised, controlled study
  - Placebo surgical control arm, to provide high quality comparative data
- Primary endpoint will be a measure of dependence / activities of daily living
  - Clinically meaningful, familiarity with stroke physicians and Regulators
- US and European sites
- Start 2017 data expected 2019



### Human Retinal Progenitor Cells





# **Retinal platform**

- Based on human retinal progenitor cells (hRPCs)
  - Rescuing existing photoreceptors to preserve vision
  - Maturing into fully functional photoreceptors to restore vision
- Three patent families define unique cell properties and permit large scale cell bank generation
- Collaborations:
  - Schepens Eye Research Inst. (Harvard Medical School)
  - UCL Institute of Ophthalmology (Moorfields, London)
  - Foundation Fighting Blindness (US)





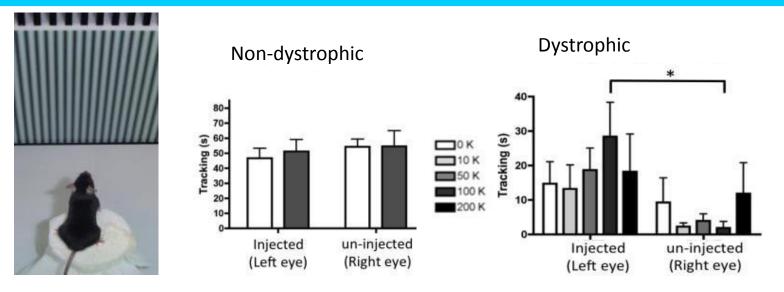
# hRPCs for retinitis pigmentosa

- RP is an inherited, degenerative eye disease
  - Causes severe vision impairment and often blindness
  - Incidence of RP is 1:4000 in the US with an estimated treatment population of 275,000 in the US and EU
- First therapeutic target for hRPCs
- Orphan Drug Designation in EU and the US & Fast Track Designation in US
- Phase I/II study ongoing in the US



**RP** vision

# **RP: IND-enabling pre-clinical efficacy data**

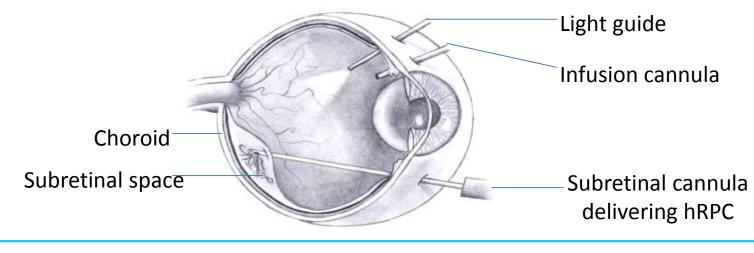


- Significantly improved visual function in the hRPC treated eyes compared with the untreated eyes at 6 months post treatment\*
- hRPC cells extend into the ganglion cell layer, the origin of the optic nerve fibres leading to the brain, demonstrating full integration of cells\*

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# **RP: Clinical development – Phase I/II**

- Dose escalation study in adult patients with established RP
- 3 dose groups of 3 subjects each (Phase I)
- 6 additional patients at highest safe dose (Phase II)
- Primary endpoint is safety, with visual acuity, visual field, retinal sensitivity and retinal structure as secondary efficacy measures
- Measurements in both treated and untreated eyes for comparison
- Clinical site Massachusetts Eye & Ear Infirmary, Boston (PI: Dr Eric Pierce)





### **Exosome Platform**



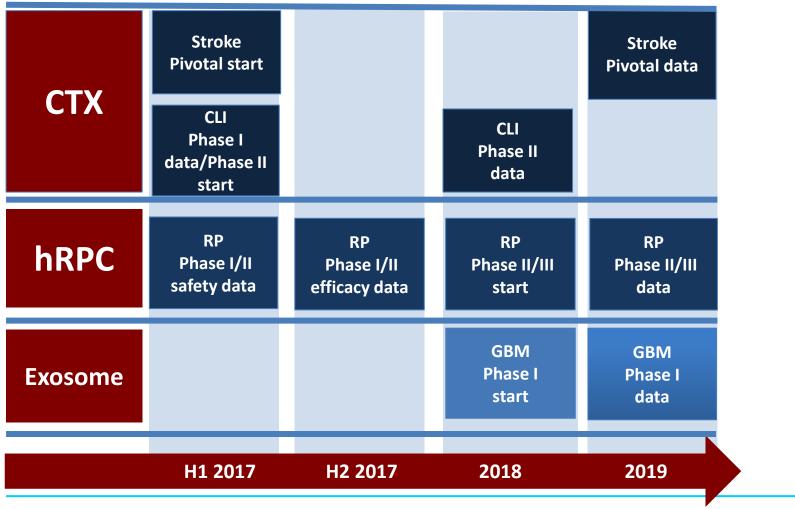


# **Exosome nanomedicine platform**

- Exosomes nano-sized vesicles that are important in cell to cell signalling
- Multiple patent applications filed on *CTX*-derived exosomes
- Potential new nanomedicine (cancer):
  - Exosome therapeutic candidate selected (*ExoPrO*)
  - Glioblastoma multiforme (GBM) selected as first clinical target
    - Most aggressive of all brain cancers
    - 5 year survival 4% to 6%
    - Incidence approximately 25,000 patients per annum in US & Europe
    - Poorly served by existing treatments
- \$2.6m Innovate UK grant to pursue *ExoPrO* pre-clinical development
  - Collaborators Netherlands Cancer Institute, UCL, Cell & Gene Therapy Catapult
- Collaborative strategy to exploit exosomes as potential delivery system for gene therapy



### **Projected milestones**





# Summary

- Global leader in cell-based therapeutics
- Allogeneic stem cell technology platforms scalable & cost effective
- Targeting diseases with large unmet medical needs
- Significant clinical milestones expected across portfolio during each of the next three years
- Well backed and well funded strong UK institutional shareholder base
- Strong leadership team
- Significant opportunity to help patients currently without any treatment options





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